

Table S17. A list of the 46 traits in 13 major phenotype groups.

Blood	Hgb MCV PCV PLT RBC WBC MCH
Homocysteine	Homocysteine
Glycaemia	Glucose Insulin
Insulin resistant	HOMA_b HOMA_ir
Lipid	TotalCholesterol HDL LDL VLDL ApoA1 ApoB Triglycerides
Inflammatory	HsCRP
Kidney	Uric_Acid Bicarbonate Creatinine Phosphate Sodium Urea
Liver	Albumin Alkaline Bilirubin GGT
Body	Height Weight BMI Waist Hip WHR
Electrical	ECG HeartRate RR Interval

	QT Interval
BP	Systolic BP Diastolic BP
Lung	FVC FEV1 FEV1.FVC Ratio
Extended	Total Fat Mass Total Lean Mass

Table S18. A list of P-values of 54 genes significantly associated with 46 traits us

Gene	Statistical Methods						
	QRFCCA	FCCA	GAMuT	SCCA	USAT	MANOVA	CCA
VILL	1.7E-08	2.4E-07	3.0E-06	1.2E-04	9.1E-01	9.8E-01	9.5E-01
KRT27	2.0E-08	3.6E-08	9.4E-02	2.3E-03	9.8E-01	9.7E-01	9.6E-01
RNU6-1243P	2.3E-08	1.3E-07	1.4E-05	1.3E-04	8.1E-01	8.4E-01	9.1E-01
RP11-6N17.10	2.5E-08	5.3E-08	8.5E-06	2.7E-04	8.0E-01	8.4E-01	9.3E-01
AL358134.2	2.8E-08	1.1E-08	1.6E-02	8.1E-04	9.3E-01	9.1E-01	9.9E-01
GAPDH	3.0E-08	6.5E-07	7.3E-04	1.1E-04	9.3E-01	8.1E-01	8.9E-01
DERL1	3.5E-08	1.1E-06	8.0E-04	2.0E-04	9.9E-01	9.3E-01	9.4E-01
RP1-102E24.9	4.3E-08	2.9E-06	3.1E-06	1.5E-04	8.6E-01	9.5E-01	9.7E-01
PPBP	4.8E-08	2.8E-08	9.2E-06	7.0E-04	9.8E-01	9.4E-01	9.6E-01
LINC00443	5.1E-08	6.1E-05	5.4E-06	2.3E-04	9.6E-01	9.6E-01	9.3E-01
RP11-10O17.1	5.2E-08	1.2E-04	1.4E-01	2.7E-04	9.7E-01	9.5E-01	9.5E-01
PROCA1	5.6E-08	4.2E-07	9.8E-04	5.9E-03	7.1E-01	6.7E-01	9.6E-01
CHMP2B	6.0E-08	3.3E-08	5.1E-06	3.0E-04	8.2E-01	9.3E-01	9.2E-01
IGKV2-4	6.3E-08	2.8E-07	5.9E-06	1.3E-04	9.9E-01	8.1E-01	9.1E-01
AC017104.1	8.2E-08	1.2E-06	1.4E-03	2.2E-03	9.2E-01	8.3E-01	9.5E-01
RNU6-980P	8.2E-08	2.7E-07	5.0E-04	3.2E-04	9.7E-01	7.0E-01	8.3E-01
AC016691.2	8.9E-08	8.3E-07	5.5E-03	1.9E-04	9.3E-01	9.2E-01	9.9E-01
RNA5SP19	9.0E-08	2.4E-07	1.1E-03	6.8E-04	9.9E-01	6.2E-01	9.6E-01
snoU13	9.2E-08	9.8E-05	9.9E-06	1.3E-04	9.0E-01	9.1E-01	9.4E-01
MLN	9.5E-08	6.6E-07	4.7E-06	1.1E-04	9.0E-01	9.4E-01	9.5E-01
RP11-55L4.2	1.0E-07	8.9E-07	1.1E-03	6.3E-03	8.2E-01	3.6E-01	7.0E-01
CTC-505O3.2	1.2E-07	4.0E-07	9.9E-03	2.3E-03	9.5E-01	9.3E-01	9.6E-01
ISCA1P1	1.2E-07	2.2E-07	1.3E-03	1.3E-04	9.9E-01	9.4E-01	9.1E-01
JUN	1.3E-07	8.7E-08	4.6E-02	1.0E-06	7.9E-01	9.9E-01	9.9E-01
AC140061.12	1.4E-07	1.8E-07	8.0E-03	1.2E-04	8.3E-01	1.2E-02	1.1E-01
RP11-697E2.10	1.8E-07	2.7E-07	5.4E-03	4.0E-04	6.2E-01	6.1E-01	8.5E-01
RNU6-717P	1.9E-07	2.5E-07	9.1E-03	1.7E-03	9.8E-01	2.9E-01	5.8E-01
RP11-98D18.17	2.4E-07	2.5E-07	1.1E-03	6.6E-03	9.2E-01	3.8E-01	6.8E-01
PPIAP13	2.4E-07	2.3E-06	3.6E-02	2.4E-04	9.6E-01	9.5E-01	9.1E-01
SETP2	2.7E-07	2.6E-06	2.7E-04	6.0E-04	8.0E-01	9.7E-01	9.4E-01
AC008691.1	3.2E-07	7.4E-07	3.4E-04	1.1E-04	9.1E-01	9.2E-01	9.9E-01
RP1-40E16.2	3.4E-07	5.7E-06	1.3E-04	1.8E-04	9.1E-01	7.9E-01	9.8E-01
RP11-79P5.9	3.5E-07	2.5E-07	1.6E-03	7.9E-04	9.9E-01	7.6E-01	9.7E-01
RN7SL699P	3.7E-07	1.6E-06	2.3E-02	8.0E-03	6.6E-01	9.3E-01	9.3E-01
OR4A44P	3.9E-07	3.8E-05	4.9E-03	1.3E-03	8.4E-01	9.8E-01	9.3E-01
C7orf71	4.8E-07	1.2E-07	1.6E-04	7.2E-04	1.0E+00	8.9E-01	9.8E-01
COMP	4.8E-07	1.4E-06	1.3E-03	1.0E-03	8.8E-01	6.7E-01	9.8E-01
PCDHB10	5.0E-07	1.1E-06	5.2E-01	1.8E-04	9.8E-01	8.5E-01	8.8E-01
HOXB1	5.3E-07	7.8E-07	3.9E-03	7.1E-04	9.1E-01	9.0E-01	9.8E-01
RN7SKP280	5.4E-07	5.8E-07	5.2E-03	4.2E-03	9.2E-01	9.6E-01	9.7E-01
SEC31A	5.5E-07	2.7E-05	3.5E-04	2.3E-03	9.7E-01	9.1E-01	9.3E-01

RP11-363E6.4	6.6E-07	8.3E-07	3.6E-02	1.0E-06	9.0E-01	9.4E-01	9.8E-01
SHISA4	6.8E-07	4.0E-07	1.0E-02	3.0E-03	9.8E-01	5.7E-01	9.4E-01
DAZAP2P1	8.0E-07	3.2E-05	6.5E-06	1.5E-04	9.2E-01	1.2E-02	3.0E-02
PGLYRP3	9.0E-07	2.5E-07	4.8E-03	1.3E-04	9.1E-01	9.1E-01	9.5E-01
RP11-138H8.4	1.1E-06	1.9E-05	2.0E-03	1.4E-04	9.2E-01	6.3E-01	9.2E-01
RP11-153M7.3	1.1E-06	2.5E-04	7.0E-03	6.0E-04	8.7E-01	9.6E-01	1.0E+00
EPS8L2	1.2E-06	1.7E-06	5.5E-02	1.6E-03	9.6E-01	9.7E-01	9.7E-01
HPN	1.2E-06	4.7E-06	2.0E-02	1.3E-04	7.2E-01	9.6E-01	9.3E-01
AC092685.1	1.3E-06	4.0E-04	6.5E-06	1.1E-04	9.8E-01	9.0E-01	9.2E-01
AC079781.1	1.4E-06	2.5E-04	2.2E-04	1.4E-03	8.8E-01	5.7E-02	1.5E-01
CTD-2014B16.2	1.4E-06	7.1E-06	9.8E-06	1.3E-03	9.5E-01	9.6E-01	9.8E-01
SULT1B1	1.4E-06	1.7E-05	1.6E-03	1.5E-03	7.0E-01	9.8E-01	9.1E-01
RP11-57G22.1	1.4E-06	3.7E-05	8.2E-03	1.6E-03	8.1E-01	2.4E-01	6.6E-01

sing QRFCCA

PCA	KCCA	MSKAT
7.0E-05	9.0E-01	1.32E-05
1.2E-01	9.3E-01	0.000331
8.2E-05	6.9E-01	8.87E-09
5.8E-08	3.2E-01	6.68E-10
5.0E-01	9.0E-01	0.015107
8.7E-07	1.0E+00	5.56E-06
2.4E-02	9.6E-01	0.027771
7.8E-06	8.1E-01	7.64E-06
3.7E-04	6.7E-01	1.67E-06
7.5E-03	4.3E-01	0.002061
7.7E-02	2.2E-01	0.089856
7.4E-02	8.3E-01	1.14E-06
5.5E-02	4.6E-01	4.04E-06
4.4E-04	1.0E+00	0.000662
2.7E-04	1.0E+00	2.77E-05
1.1E-07	4.1E-01	0.000294
1.3E-07	6.5E-01	0.002929
3.0E-06	9.4E-01	1.30E-08
9.9E-01	5.6E-01	5.76E-06
2.6E-04	9.4E-01	5.77E-10
3.6E-01	9.6E-03	0.000578
4.6E-02	2.4E-01	9.57E-08
3.9E-06	5.3E-01	0.018924
7.8E-01	2.6E-01	0.000111
1.1E-02	3.6E-01	6.43E-06
9.9E-01	1.1E-02	0.000469
5.6E-01	2.5E-06	0.006229
2.9E-07	8.6E-03	0.009645
8.2E-02	9.0E-01	7.86E-07
5.6E-04	3.7E-01	0.045012
4.0E-03	4.6E-01	6.88E-06
7.6E-02	9.2E-01	7.73E-05
2.8E-01	7.5E-01	0.000329
7.5E-01	4.8E-01	6.88E-05
1.8E-02	2.2E-01	0.002266
6.3E-02	3.3E-01	0.037812
5.0E-02	2.2E-01	7.54E-07
7.3E-01	3.7E-01	0.001004
2.1E-03	5.1E-01	0.240587
4.4E-02	9.2E-01	8.68E-07
1.6E-06	3.1E-01	0.060277

2.7E-01	6.3E-01	0.008889
5.2E-01	1.0E+00	0.002748
5.4E-06	2.7E-06	0.009093
2.3E-01	5.7E-01	2.34E-06
1.2E-01	3.7E-01	2.86E-05
7.1E-02	9.5E-01	0.000218
3.4E-01	4.3E-01	0.003988
4.7E-01	3.1E-01	0.000156
4.4E-03	1.0E+00	0.001274
6.4E-08	7.8E-03	7.85E-05
6.4E-02	5.4E-01	1.48E-07
9.0E-02	9.4E-01	0.000431
2.1E-03	3.9E-01	0.009357

Table S19. A list of top ten genes ranked by GAMuT.

Gene	Chr	QRFCCA	GAMuT
AC008694.3	5	1.39E-08	2.43E-06
RP4-742C19.12	22	1.04E-05	2.78E-06
VILL	3	1.69E-08	2.96E-06
RP1-102E24.9	12	4.32E-08	3.06E-06
RNU6-1229P	7	5.83E-03	3.41E-06
TNNT3	11	4.94E-06	3.52E-06
MLN	6	9.47E-08	4.70E-06
CHMP2B	3	6.03E-08	5.06E-06
LINC00443	13	5.08E-08	5.37E-06
RP11-400N9.1	2	2.73E-05	5.41E-06

Table S20. A list of P-value of all rare SNPs within gene ADAM19.

	P-value
QFCCA (ADAM19)	6.07E-11
GAMuT (ADAM19)	8.17E-01
SNP or Genomic Position	
rs191008415	4.05E-28
156968065	3.18E-25
156910533	1.57E-08
156990160	3.51E-08
rs35911462	2.08E-06
156932396	3.20E-06
rs149236204	1.93E-04
rs146419018	4.76E-04
rs147457580	7.28E-04
156997304	8.48E-04
rs139626715	6.10E-03
rs201250158	8.31E-03
rs143506109	3.10E-02
rs188856674	3.77E-02
rs149634622	4.06E-02
rs188436117	4.18E-02
rs34603646	4.95E-02
156954511	5.82E-02
rs78468979	6.33E-02
rs184699772	7.06E-02
156944190	7.81E-02
rs11466758	8.18E-02
rs62388506	8.18E-02
rs11465266	9.26E-02
rs141181941	1.03E-01
rs188195103	1.15E-01
156990480	1.24E-01
rs184288975	1.33E-01
rs141821577	1.37E-01
rs115527546	1.43E-01
rs62388487	1.47E-01
rs115502782	1.49E-01
rs139340220	1.62E-01
rs4704869	1.73E-01
rs114882516	1.88E-01
rs56243836	1.97E-01
rs116556518	2.10E-01
rs7725400	2.13E-01
rs11744541	2.23E-01
rs72811356	2.24E-01
rs55717305	2.38E-01
rs11466803	2.41E-01

rs151138638	2.52E-01
rs184623076	2.55E-01
rs185647117	2.56E-01
rs143031163	2.65E-01
rs72811314	2.66E-01
156933734	2.92E-01
rs186859909	3.05E-01
rs181070111	3.05E-01
rs6556092	3.09E-01
rs79116280	3.09E-01
rs144608237	3.14E-01
rs181426847	3.15E-01
rs138725997	3.68E-01
rs184205806	4.02E-01
rs34882961	4.12E-01
rs2902557	4.27E-01
rs183481901	4.45E-01
rs62388508	4.69E-01
rs115525841	5.03E-01
rs72811306	5.13E-01
rs146616158	5.22E-01
rs147490600	5.27E-01
rs141699542	5.30E-01
rs10078120	5.51E-01
rs150874473	5.56E-01
rs114799047	5.66E-01
156944672	5.79E-01
156898877	5.99E-01
156937135	6.04E-01
rs116298982	6.13E-01
rs148264060	6.26E-01
rs142509617	6.72E-01
rs77760678	6.87E-01
rs200159796	6.88E-01
rs114064162	7.06E-01
rs78564361	7.06E-01
rs72811340	7.07E-01
156959046	7.10E-01
rs187328397	7.19E-01
rs144038216	7.55E-01
rs191259967	7.57E-01
rs112724886	7.59E-01
rs182111619	7.60E-01
rs11465245	7.65E-01
rs114912544	7.67E-01
rs149216255	7.76E-01
rs34750645	7.82E-01

rs11465265	7.89E-01
156927814	7.94E-01
rs115231378	8.01E-01
rs62388526	8.02E-01
rs56384823	8.10E-01
rs11466808	8.13E-01
rs149445339	8.15E-01
rs183178230	8.22E-01
156989890	8.24E-01
rs11465278	8.30E-01
rs112307138	8.31E-01
rs11466814	8.35E-01
rs181287300	8.65E-01
rs115133320	8.68E-01
rs146558727	8.72E-01
rs185494681	8.76E-01
rs138324979	8.83E-01
rs189254582	8.84E-01
rs147064466	8.88E-01
156971132	8.94E-01
156995485	9.09E-01
rs113511170	9.18E-01
rs189607262	9.35E-01
rs11465257	9.49E-01
rs61753548	9.49E-01
rs114990221	9.50E-01
rs181394073	9.60E-01
rs141189988	9.61E-01
rs111644980	9.67E-01
rs150670035	9.77E-01
rs143341739	9.77E-01
rs11466811	9.79E-01
rs72811335	9.79E-01
rs78606727	9.82E-01
rs188402615	9.86E-01
rs11466767	9.95E-01
rs146539692	9.98E-01
rs75821300	9.98E-01
rs115271681	9.99E-01
156958272	9.99E-01

Table S21. A list of traits which a single gene was associated with.

Gene	Chromosome			
CTC-498M16.2	5	ALL	5.74E-22 HOMA_ir	6.56E-26
TRAJ22	14	ALL	2.16E-20 HOMA_ir	3.56E-28
AP000351.10	22	ALL	2.09E-18 HOMA_ir	4.68E-25
HAR1B	20	ALL	7.81E-18 Creatinine	1.23E-51
IGHVII-20-1	14	ALL	7.49E-16 Creatinine	2.01E-29
RP11-4F5.2	15	ALL	9.94E-16 HOMA_ir	2.03E-20
RNVU1-17	1	ALL	3.90E-13 Total_Fat_Ma	0.000718852
PNOC	8	ALL	1.63E-12 VLDL	9.15E-09
COTL1P1	17	ALL	8.71E-12 HOMA_ir	7.30E-09
LINC00273	16	ALL	4.41E-11 Creatinine	8.57E-13
snoU13	12	ALL	4.95E-11 HOMA_ir	9.84E-15
ADAM19	5	ALL	6.07E-11 HOMA_b	1.02E-31
CTD-2026G6.2	3	ALL	1.91E-10 HOMA_b	2.57E-22
MIR409	14	ALL	2.77E-10 Creatinine	7.40E-19
RP1-276E15.1	11	ALL	3.13E-10 Creatinine	3.23E-09
HMGN1P6	2	ALL	4.46E-10 HsCRP	0.000126436
HOXA7	7	ALL	2.18E-09 Creatinine	1.41E-24
RNA5SP99	2	ALL	2.41E-09 Creatinine	6.03E-12
AC021660.1	3	ALL	2.69E-09 Hip	0.001745979
RP11-561N12.1	7	ALL	3.12E-09 HOMA_ir	1.80E-13
FBXL5	4	ALL	4.53E-09 Creatinine	6.40E-05
PPIAP23	13	ALL	5.40E-09 Glucose	8.37E-10
HOXB2	17	ALL	7.00E-09 HOMA_b	0.000564076
RP11-170N16.1	4	ALL	7.09E-09 HOMA_ir	4.97E-05
AC008694.3	5	ALL	1.39E-08 Creatinine	0.003954873
VILL	3	ALL	1.69E-08 Creatinine	2.23E-08
KRT27	17	ALL	2.04E-08 HOMA_ir	1.40E-05
RNU6-1243P	11	ALL	2.28E-08 Creatinine	2.75E-05
RP11-6N17.10	17	ALL	2.49E-08 HOMA_ir	1.95E-07
AL358134.2	6	ALL	2.83E-08 Creatinine	1.33E-21
GAPDH	12	ALL	2.96E-08 Creatinine	3.45E-08
DERL1	8	ALL	3.45E-08 Creatinine	5.04E-06
RP1-102E24.9	12	ALL	4.32E-08 Creatinine	5.21E-07
PPBP	4	ALL	4.79E-08 Creatinine	0.000282027
LINC00443	13	ALL	5.08E-08 Creatinine	1.66E-11
RP11-10017.1	15	ALL	5.19E-08 Glucose	2.90E-08
PROCA1	17	ALL	5.62E-08 HOMA_ir	8.28E-07
CHMP2B	3	ALL	6.03E-08 Creatinine	0.002346817
IGKV2-4	2	ALL	6.33E-08 Creatinine	0.000421234
AC017104.1	2	ALL	8.15E-08 HOMA_ir	8.77E-11
RNU6-980P	19	ALL	8.16E-08 HOMA_ir	1.30E-12
AC016691.2	2	ALL	8.89E-08 Creatinine	1.12E-08

RNA5SP19	1	ALL	9.03E-08	HOMA_ir	9.48E-09
snoU13	6	ALL	9.16E-08	HsCRP	0.000380108
MLN	6	ALL	9.47E-08	Glucose	6.24E-11
RP11-55L4.2	17	ALL	1.03E-07	HOMA_ir	2.18E-11
CTC-505O3.2	5	ALL	1.22E-07	Creatinine	1.37E-06
ISCA1P1	5	ALL	1.23E-07	VLDL	1.41E-07
JUN	1	ALL	1.25E-07	Creatinine	3.44E-20
AC140061.12	12	ALL	1.41E-07	Creatinine	2.11E-16
RP11-697E2.10	15	ALL	1.77E-07	Creatinine	2.22E-21
RNU6-717P	12	ALL	1.91E-07	HsCRP	2.50E-12
RP11-98D18.17	1	ALL	2.36E-07	HOMA_ir	2.77E-06
PPIAP13	10	ALL	2.43E-07	Creatinine	1.90E-06
SETP2	14	ALL	2.67E-07	Creatinine	1.15E-22
AC008691.1	5	ALL	3.15E-07	Creatinine	2.56E-07
RP1-40E16.2	6	ALL	3.38E-07	HsCRP	6.49E-10
RP11-79P5.9	5	ALL	3.54E-07	Glucose	3.99E-07
RN7SL699P	17	ALL	3.69E-07	HOMA_ir	2.86E-09
OR4A44P	11	ALL	3.94E-07	GGT	0.005636472
C7orf71	7	ALL	4.80E-07	PLT	0.000205223
COMP	19	ALL	4.83E-07	Creatinine	9.58E-15
PCDHB10	5	ALL	4.97E-07	HsCRP	3.02E-11
HOXB1	17	ALL	5.27E-07	HOMA_ir	7.99E-07
RN7SKP280	7	ALL	5.39E-07	Alkaline	0.000294435
SEC31A	4	ALL	5.51E-07	Uric_Acid	0.000657855
RP11-363E6.4	8	ALL	6.56E-07	PLT	3.81E-12
SHISA4	1	ALL	6.84E-07	HOMA_ir	1.48E-08
DAZAP2P1	2	ALL	7.97E-07	Creatinine	0.000290958
PGLYRP3	1	ALL	8.97E-07	Creatinine	8.97E-10
RP11-138H8.4	15	ALL	1.09E-06	Bilirubin	5.60E-05
RP11-153M7.3	4	ALL	1.10E-06	PCV	0.01321897
EPS8L2	11	ALL	1.15E-06	Creatinine	2.49E-08
HPN	19	ALL	1.15E-06	Creatinine	9.61E-07
AC092685.1	7	ALL	1.34E-06	Creatinine	4.49E-08
AC079781.1	7	ALL	1.36E-06	HsCRP	1.50E-10
CTD-2014B16.2	14	ALL	1.41E-06	Phosphate	0.000388972
SULT1B1	4	ALL	1.43E-06	TotalCholeste	0.000987772
RP11-57G22.1	18	ALL	1.44E-06	Diastolic_BP	0.000361512

Insulin	4.26E-11	Glucose	3.84E-08	Systolic_I	0.001956	Diastolic_	0.029416
Glucose	7.53E-12	Insulin	2.47E-11	Urea	0.006493	Uric_Acic	0.048675
Insulin	6.69E-10	Glucose	2.13E-07	Phosphate	0.013555	Height	0.022553
Urea	2.17E-07	GGT	0.008421	WHR	0.011319	Waist	0.019045
Urea	6.33E-05	WBC	0.010865	ECG_Hea	0.01918	RR_Interv	0.02229
Insulin	5.26E-10	Homocyst	2.56E-06	Glucose	0.001579	HsCRP	0.026557
Hip	0.000771	BMI	0.001168	Weight	0.001773	HOMA_i	0.002227
Triglycerid	9.15E-09	HOMA_i	1.21E-07	Insulin	0.002612	Glucose	0.00826
Glucose	2.41E-08	GGT	5.35E-07	Insulin	0.006809		
Glucose	1.15E-05	HOMA_i	3.35E-05	LDL	0.001232	TotalChol	0.007672
Insulin	1.70E-06	ApoB	0.001961	MCH	0.003053	Glucose	0.010992
Creatinine	1.16E-05	Glucose	0.002678	HsCRP	0.004913	Insulin	0.029635
GGT	6.17E-07	Bicarbona	0.016391				
Hip	7.19E-07	Total_Lea	2.15E-06	Weight	1.65E-05	BMI	0.000148
HOMA_ir	7.14E-08	Insulin	1.40E-05	HOMA_b	0.0011	Homocyst	0.001438
HOMA_b	0.001411	HOMA_i	0.001467	Glucose	0.041752		
Urea	8.97E-06	HOMA_b	0.017358	Bilirubin	0.01787	Total_Lea	0.034116
Diastolic_B	0.007365	HsCRP	0.019323	Insulin	0.019335	Bicarbona	0.020459
GGT	0.002209	HOMA_b	0.005389	Systolic_I	0.012018	BMI	0.012338
Glucose	7.41E-08	Insulin	5.07E-07	Sodium	1.85E-05	ApoB	0.001165
PCV	0.002071	Hgb	0.002115	Phosphate	0.00811	Alkaline	0.022042
Creatinine	2.48E-06	HOMA_i	4.31E-06	Insulin	0.001131	FVC	0.002255
Homocyste	0.001419	Hgb	0.002353	PCV	0.004896	Sodium	0.008226
Insulin	0.01038	Total_Fat	0.01354	HsCRP	0.016426	FEV1.FV	0.022457
ECG_Heart	0.005142	RR_Interv	0.006365	Sodium	0.022489	Bilirubin	0.023863
TotalChole	0.001057	LDL	0.002498	ApoB	0.002941	HsCRP	0.006357
VLDL	0.000197	Triglyceri	0.000197	HsCRP	0.000407	Creatinine	0.000792
Glucose	9.44E-05	GGT	0.002032	FEV1.FV	0.003483	Total_Lea	0.00548
Creatinine	2.93E-06	Insulin	3.27E-05	Diastolic_	0.000887	Glucose	0.002072
Urea	0.033409	FVC	0.046864				
HOMA_ir	1.43E-05	VLDL	4.62E-05	Triglyceri	4.62E-05	Glucose	0.000164
Urea	0.000999	Alkaline	0.001949	Uric_Acic	0.003094	Glucose	0.005175
GGT	0.001544	Uric_Acic	0.00814	HsCRP	0.008199	MCV	0.017594
HOMA_ir	0.001707	GGT	0.006442	MCH	0.03834	MCV	0.039668
Urea	0.006732	Diastolic_	0.025616	HOMA_b	0.045981	Total_Lea	0.047506
HOMA_ir	6.99E-08	Creatinine	5.23E-06	Bicarbona	5.23E-05	Insulin	0.000102
Insulin	0.000451	Phosphate	0.002443	Urea	0.00394	Alkaline	0.00543
ApoA1	0.006587	Albumin	0.014431	TotalChol	0.015285	HOMA_i	0.015898
ApoB	0.002251	Insulin	0.016273	Glucose	0.022997	TotalChol	0.034153
Triglycerid	3.00E-05	VLDL	3.00E-05	GGT	7.96E-05	Insulin	9.39E-05
Insulin	1.61E-06	Glucose	0.000767	Hip	0.020059	FVC	0.028685
HOMA_ir	6.26E-07	HOMA_b	2.07E-06	Insulin	1.34E-05	RBC	0.013824

0.02525 ECG_Hea	0.03049 RR_Interv	0.04365			
0.03739					
0.03686 QT_Interv	0.03774 Systolic_I	0.03906 Sodium	0.03999		
0.03519 FEV1	0.03717 HOMA_b	0.03738			
0.0171 Waist	0.01799 Total_Lea	0.03105 RBC	0.04576		
0.01372 Albumin	0.02241 FEV1.FV	0.03082			
0.01615 ApoB	0.01743 Total_Lea	0.01918 Hgb	0.02495 Phosphate	0.03771 WHR	
0.03395 VLDL	0.03395				
0.00026 Waist	0.00035 Uric_Acic	0.00206 Total_Fat	0.0024 HsCRP	0.03814 Insulin	
0.00256 RBC	0.00636 Urea	0.01393 WHR	0.01409 BMI	0.01537 Total_Lea	
0.03621					
0.03352 Glucose	0.03451 Triglyceri	0.0478 VLDL	0.0478		
0.01659 Diastolic_	0.01743 Bicarbona	0.02732 Sodium	0.03585 Height	0.03943 HOMA_i	
0.00434 FEV1.FV	0.00536 BMI	0.00849 VLDL	0.00979 Triglyceri	0.00979 Albumin	
0.0243					
0.00483 FEV1	0.00681 Alkaline	0.01493 Height	0.01873 PLT	0.03135 Phosphate	
0.00984 ECG_Hea	0.01326 Insulin	0.01521 RR_Interv	0.01787 FEV1.FV	0.03069 Diastolic_	
0.0271 HOMA_b	0.03586 Urea	0.04716			
0.02777 MCH	0.03854 MCV	0.04543 HsCRP	0.04685		
0.0083 BMI	0.02207 HOMA_i	0.02618 Bicarbona	0.04052		
0.00328 PLT	0.01206 Insulin	0.01342 Hgb	0.03425 QT_Interv	0.04934	
0.00642 HOMA_b	0.00842 ApoA1	0.01216 BMI	0.01447 Weight	0.03267 Diastolic_	
0.0092 ECG_Hea	0.00959 Systolic_I	0.01572 RR_Interv	0.01974 Weight	0.02842 HDL	
0.00113 Systolic_I	0.03504 Insulin	0.0444			
0.00884 HOMA_b	0.00953 WBC	0.01846 Insulin	0.02524 VLDL	0.04373 Triglyceri	
0.02181 FEV1.FV	0.02501 Urea	0.03353 Insulin	0.04318 MCH	0.04625	
0.04319					
0.04829 GGT	0.04881 QT_Interv	0.04924 FEV1	0.04952		
0.00039 Homocyst	0.02875				
0.00649 Uric_Acic	0.00811 Systolic_I	0.01451 Creatinine	0.0187 GGT	0.04389	
0.02332 Bilirubin	0.02373 Hip	0.03508 Phosphate	0.03719		
0.0356					
0.00166 Glucose	0.00856 Height	0.03327 Total_Lea	0.04348		
0.02979 Sodium	0.04044 FEV1	0.04109			
0.01919 Hip	0.02757 BMI	0.03119 Systolic_I	0.03384 MCV	0.04497	

0.00782 RBC	0.01174 MCH	0.01522 Bilirubin	0.02582 BMI	0.02987 HsCRP
0.03343				
0.01294 FVC	0.01431 WHR	0.02436 Bilirubin	0.03443	
0.03015				
0.00216 FEV1	0.01157 BMI	0.01347 Weight	0.02145 Systolic_I	0.04599 Total_Fat.
0.01947 Total_Lea	0.02162 Insulin	0.02283 Total_Fat.	0.02878 Weight	0.02913 BMI
0.02791 VLDL	0.0369 Triglyceri	0.0369 Total_Lea	0.04158 Insulin	0.04671 Total_Fat.
0.00997 Urea	0.03917			
0.00488 RBC	0.00767 WBC	0.01534 Hgb	0.02067 RR_Interv	0.02213 Urea
0.01617 Glucose	0.02728			
0.00636 Total_Fat.	0.01651 RBC	0.01796 BMI	0.02298 Waist	0.03608 LDL
0.03971				
0.02185 Height	0.04661			
0.01971				
0.03197				
0.00745 WHR	0.01033 WBC	0.01243 Systolic_I	0.0132 Bicarbona	0.03434 QT_Interv
0.01576 QT_Interv	0.02616 GGT	0.03635 Bilirubin	0.04596 LDL	0.04968
0.04199 FEV1.FV	0.0441			

0.04524

0.04015

0.02513 WBC 0.029847 Weight 0.030837

0.0475

0.01049 Total_Fat_ 0.014248 LDL 0.017979 PLT 0.024192 TotalChole 0.025487 Alkaline

0.03718 ApoA1 0.039995 GGT 0.040511

0.03209 GGT 0.03463 HOMA_ir 0.035082 RBC 0.043982 HsCRP 0.047932

0.03995 Albumin 0.041229

0.02898 Height 0.029157 Total_Lear 0.031394 Waist 0.036981 BMI 0.040466 Hip

0.04373

0.03668 Total_Lear 0.03782 Insulin 0.039445 Phosphate 0.042606

0.04808

0.04033 Height 0.045741

0.04797 Homocyste 0.048268

0.03522 Triglycerid 0.043163 VLDL 0.043163

0.03663 Hip 0.037032

0.04624

0.040268

0.041994 Urea

0.042429

Table S22. Number of genes consisting of only rare variants significantly associated with single trait

Blood							Homocysteine
Hgb	MCV	PCV	PLT	RBC	WBC	MCH	Homocysteine
0	0	0	3	2	0	0	10
Lipid							Inflammatory
TotalChol	HDL	LDL	VLDL	ApoA1	ApoB	Triglycerides	HsCRP
0	0	0	11	0	0	11	72
Kidney						Liver	
Uric Acid	Bicarbona	Creatinine	Phosphate	Sodium	Urea	Albumin	Alkaline
0	1	345	0	0	3	0	0
Body							Electrical
Height	Weight	BMI	Waist	Hip	WHR	ECG Heart Rate	RR Interval
1	0	0	0	1	0	0	0

it.

Glycaemia		Insulin Resistance		
Glucose	Insulin	HOMA-B	HOMA-IR	
21	15	20	108	
Extended				
Total Fat		Total Lean Mass		
0	0			
Lung				
Bilirubin	GGT	FVC	FEV1	FEV1-FVC-Ratio
2	14	2	2	0
BP				
QT Interv:	SBP	DBP		
0	0	1		

Table S23. A list of P-values of top 42 genes with common variants only significantly associated w

Gene	Statistical Methods						
	QRFCCA	FCCA	GAMuT	SCCA	USAT	MANOVA	CCA
UBE2U	2.9E-15	4.0E-15	2.6E-02	1.2E-04	8.3E-01	9.0E-01	9.3E-01
BATF2	5.9E-15	2.3E-11	6.9E-01	3.2E-03	8.0E-02	9.3E-01	9.6E-01
C5orf51	1.0E-14	7.1E-15	1.0E-03	2.0E-06	4.9E-01	9.8E-01	9.6E-01
RP11-814P5.1	1.3E-14	3.6E-15	7.2E-01	4.5E-04	6.0E-01	1.0E+00	9.7E-01
USP44	3.5E-14	1.3E-14	2.7E-01	1.5E-03	8.2E-01	9.9E-01	9.1E-01
C12orf5	4.9E-14	5.2E-14	4.7E-01	1.0E-03	6.9E-01	9.8E-01	9.3E-01
SSH2	5.6E-14	3.0E-14	7.4E-03	3.3E-05	8.4E-01	9.9E-01	9.0E-01
PHIP	3.0E-13	2.5E-13	4.2E-01	1.7E-05	2.5E-01	9.8E-01	9.2E-01
ARRDC4	1.7E-12	1.8E-12	7.7E-01	6.9E-04	3.8E-01	9.7E-01	9.9E-01
RP3-477O4.16	4.3E-12	9.7E-12	9.3E-01	2.8E-02	5.2E-01	1.0E+00	1.0E+00
FAM210B	5.6E-11	2.4E-11	2.5E-03	1.6E-05	3.9E-01	9.4E-01	9.6E-01
AF001550.7	6.5E-11	3.3E-11	5.8E-02	1.5E-04	5.9E-01	9.3E-01	1.0E+00
COLGALT1	9.5E-11	9.1E-11	9.9E-01	7.5E-04	8.1E-01	9.9E-01	9.1E-01
IGSF5	1.2E-10	1.3E-06	1.2E-01	1.1E-03	9.2E-01	9.1E-01	9.3E-01
GPR137B	3.5E-10	1.8E-10	3.1E-01	4.8E-04	5.4E-01	9.7E-01	9.4E-01
RCL1	4.9E-10	5.3E-09	7.1E-02	1.0E-06	6.1E-01	9.8E-01	9.6E-01
OXR1	1.8E-09	3.7E-09	4.0E-03	1.0E-06	9.4E-01	9.9E-01	9.9E-01
CTD-2503O16.4	1.5E-08	5.7E-09	1.7E-01	1.4E-04	9.8E-01	9.1E-01	9.7E-01
C10orf76	1.9E-08	9.1E-08	2.7E-01	3.0E-05	1.6E-01	9.0E-01	9.6E-01
SRRM4	2.3E-08	1.4E-06	1.0E-01	1.2E-04	4.7E-01	9.8E-01	9.3E-01
RASAL3	5.3E-08	3.6E-07	7.0E-01	1.9E-04	1.6E-01	8.7E-01	9.9E-01
MTHFD2P6	5.7E-08	8.3E-08	3.7E-05	1.6E-05	4.0E-01	1.5E-03	1.1E-02
UQCRBP3	7.6E-08	7.5E-08	5.4E-01	2.3E-03	5.0E-01	9.3E-01	1.0E+00
SEC14L3	7.9E-08	8.2E-07	2.4E-02	1.5E-05	5.1E-01	9.6E-01	9.4E-01
UGCG	8.0E-08	1.1E-07	5.5E-01	3.0E-03	1.4E-01	9.4E-01	9.7E-01
ZNF680	1.2E-07	4.0E-05	3.1E-01	3.8E-04	3.2E-01	9.1E-01	9.3E-01
GPR56	1.3E-07	3.8E-07	6.1E-01	6.1E-05	3.6E-01	9.8E-01	9.5E-01
CCDC26	2.0E-07	2.1E-07	1.4E-01	1.0E-06	1.1E-01	9.1E-01	9.3E-01
SOX5	2.5E-07	1.2E-05	8.6E-01	1.0E-06	4.9E-01	9.0E-01	9.1E-01
AC009892.10	3.2E-07	4.3E-07	9.8E-01	2.4E-02	3.6E-01	4.0E-01	6.6E-01
HPSE	3.2E-07	3.2E-05	4.7E-01	1.0E-06	3.3E-01	9.7E-01	9.4E-01
SLC35E4	5.1E-07	1.5E-05	3.9E-01	3.8E-04	7.1E-01	9.5E-01	9.1E-01
CTC-575D19.1	6.3E-07	2.7E-06	6.5E-01	6.8E-04	7.6E-01	1.0E+00	1.0E+00
EFTUD1	7.9E-07	6.2E-07	2.9E-02	9.0E-06	3.8E-01	9.7E-01	9.4E-01
RP4-742N3.1	9.4E-07	4.1E-06	1.9E-01	1.1E-04	7.3E-01	9.1E-01	9.3E-01
RP11-568J23.7	9.7E-07	5.5E-04	1.0E-02	1.5E-03	8.1E-01	9.8E-01	1.0E+00
AC138655.1	1.0E-06	7.7E-06	6.7E-01	7.0E-06	6.3E-01	9.7E-01	1.0E+00
EYA4	1.0E-06	1.1E-04	9.0E-01	2.1E-04	2.4E-01	9.4E-01	9.6E-01
P2RY6	1.1E-06	1.4E-06	9.2E-01	7.0E-04	8.7E-01	9.5E-01	9.5E-01
BACH2	1.2E-06	1.8E-06	6.0E-02	5.0E-06	6.7E-01	9.6E-01	9.4E-01
MSH6	1.4E-06	6.8E-06	7.2E-01	1.0E-06	9.7E-01	9.4E-01	9.9E-01

CTC-497E21.5

| 1.5E-06

4.8E-06

3.3E-01

1.0E-06

4.3E-01

9.5E-01

9.6E-01

ith 46 traits using QRFCCA.

PCA	KCCA	MSKAT
1.1E-01	9.0E-01	0.647115
4.2E-01	9.5E-01	0.012373
6.4E-01	9.7E-01	8.23E-05
3.5E-01	9.6E-01	0.461213
5.2E-01	9.9E-01	0.00138
5.5E-01	9.2E-01	0.0199
2.2E-01	9.7E-01	0.185851
7.1E-01	9.2E-01	0.042022
8.6E-01	9.7E-01	0.337233
8.8E-01	9.5E-01	0.861207
5.3E-02	9.4E-01	0.524432
9.1E-02	9.7E-01	0.139853
5.7E-02	9.6E-01	0.041859
1.7E-01	9.0E-01	0.547865
5.0E-01	9.9E-01	0.446398
5.9E-01	9.2E-01	0.908544
6.7E-01	9.6E-01	0.102838
1.7E-01	9.8E-01	0.298597
1.2E-01	9.4E-01	0.167248
3.2E-01	9.1E-01	0.117424
3.4E-01	9.1E-01	0.023521
2.7E-02	9.7E-07	2.05E-05
1.5E-01	1.0E+00	0.260786
1.1E-03	9.9E-01	0.184885
8.8E-01	9.0E-01	0.009934
7.9E-02	9.2E-01	0.001049
8.5E-01	9.3E-01	0.08076
1.1E-01	9.7E-01	2.69E-05
7.9E-01	9.3E-01	0.13182
9.2E-01	1.0E+00	0.986532
8.0E-01	1.0E+00	0.173608
5.6E-01	9.6E-01	0.00046
1.1E-01	9.4E-01	0.018417
1.5E-01	9.5E-01	0.153352
3.4E-02	9.5E-01	0.213592
1.6E-01	9.9E-01	9.47E-05
1.7E-04	9.5E-01	0.315623
6.5E-01	9.5E-01	0.000302
7.5E-01	9.6E-01	0.340408
5.0E-01	9.5E-01	0.458542
4.2E-01	9.6E-01	0.792843

3.7E-01 9.9E-01 0.078548

Table S24. A list of traits which a single gene was associated with.

Gene	Chromosome			
REG1B	2	ALL	1.65E-116 HOMA-IR	5.02E-94
RP11-665C14.1	4	ALL	1.38E-93 Creatinine	1.39E-187
ZNF160	19	ALL	1.98E-91 HOMA-IR	2.34E-80
LEF1	4	ALL	7.44E-83 HsCRP	1.22E-112
DYNC1H1	14	ALL	3.46E-58 HOMA-IR	4.76E-108
DOCK7	1	ALL	4.42E-51 HsCRP	3.66E-53
SHC3	9	ALL	7.56E-42 HOMA-IR	1.90E-49
Y_RNA	7	ALL	1.89E-36 HsCRP	1.04E-71
CTD-2122P11.1	5	ALL	1.62E-33 HsCRP	3.86E-45
GBF1	10	ALL	6.30E-28 HOMA-B	2.91E-17
RP1-8B22.1	1	ALL	1.75E-27 HOMA-B	2.03E-26
VPS13D	1	ALL	2.62E-26 Creatinine	1.41E-17
RP11-68I3.2	17	ALL	3.20E-24 Creatinine	1.04E-46
SLC13A3	20	ALL	8.51E-24 HsCRP	2.03E-13
RP11-167N24.3	12	ALL	4.33E-23 HOMA-B	6.43E-18
UBA6	4	ALL	5.26E-22 Creatinine	1.04E-42
GAN	16	ALL	1.49E-21 HsCRP	1.04E-15
RP4-794H19.2	1	ALL	4.07E-21 HOMA-IR	4.85E-19
RP11-142I20.1	18	ALL	5.29E-21 HsCRP	3.22E-18
METAP2	12	ALL	2.62E-20 HOMA-B	3.14E-32
SLCO1C1	12	ALL	5.89E-20 HOMA-B	4.25E-08
AC105443.2	7	ALL	2.47E-17 HsCRP	1.01E-46
GRN	17	ALL	1.63E-16 HOMA-IR	2.28E-29
INTS12	4	ALL	1.72E-16 HsCRP	3.85E-27
RP11-323I15.5	15	ALL	9.29E-16 Homocysteine	1.42E-07
UBE2U	1	ALL	2.88E-15 PLT	6.44E-16
BATF2	11	ALL	5.90E-15 HsCRP	4.68E-47
C5orf51	5	ALL	1.02E-14 Glucose	2.30E-18
RP11-814P5.1	15	ALL	1.28E-14 Creatinine	1.66E-32
USP44	12	ALL	3.49E-14 HsCRP	1.81E-31
C12orf5	12	ALL	4.91E-14 Creatinine	1.16E-15
SSH2	17	ALL	5.59E-14 RR_Interval	6.94E-07
PHIP	6	ALL	2.96E-13 HsCRP	7.78E-34
ARRDC4	15	ALL	1.73E-12 Creatinine	3.09E-10
RP3-477O4.16	20	ALL	4.33E-12 Creatinine	3.23E-32
FAM210B	20	ALL	5.59E-11 Triglycerides	2.99E-11
AF001550.7	16	ALL	6.53E-11 HsCRP	3.47E-15
COLGALT1	19	ALL	9.53E-11 HOMA-B	1.43E-18
IGSF5	21	ALL	1.24E-10 Triglycerides	5.02E-25
GPR137B	1	ALL	3.54E-10 GGT	6.49E-09
RCL1	9	ALL	4.88E-10 Creatinine	6.46E-09
OXR1	8	ALL	1.77E-09 Creatinine	2.27E-05

CTD-2503O16.4	5	ALL	1.48E-08 HsCRP	2.40E-05
C10orf76	10	ALL	1.89E-08 HOMA-IR	1.03E-12
SRRM4	12	ALL	2.26E-08 HsCRP	4.14E-06
RASAL3	19	ALL	5.31E-08 Creatinine	4.60E-07
MTHFD2P6	5	ALL	5.65E-08 Total_Fat_Mas	3.09E-06
UQCRBP3	5	ALL	7.58E-08 Glucose	5.54E-06
SEC14L3	22	ALL	7.90E-08 Bilirubin	0.000531772
UGCG	9	ALL	7.98E-08 HOMA-IR	1.70E-08
ZNF680	7	ALL	1.23E-07 HOMA-B	2.43E-10
GPR56	16	ALL	1.26E-07 Total_Fat_Mas	0.000154365
CCDC26	8	ALL	1.97E-07 Diastolic_BP	0.000755246
SOX5	12	ALL	2.54E-07 Creatinine	0.001588142
AC009892.10	19	ALL	3.17E-07 HOMA-IR	1.82E-11
HPSE	4	ALL	3.21E-07 FEV1.FVC_Ra	5.85E-06
SLC35E4	22	ALL	5.08E-07 HOMA-IR	8.74E-28
CTC-575D19.1	5	ALL	6.25E-07 ApoB	0.000153801
EFTUD1	15	ALL	7.87E-07 QT_Interval	0.000109083
RP4-742N3.1	7	ALL	9.42E-07 HOMA-IR	1.06E-10
RP11-568J23.7	16	ALL	9.69E-07 Creatinine	2.46E-12
AC138655.1	2	ALL	1.01E-06 Total_Fat_Mas	2.24E-06
EYA4	6	ALL	1.05E-06 HDL	0.000701759
P2RY6	11	ALL	1.11E-06 HsCRP	9.58E-22
BACH2	6	ALL	1.24E-06 Height	0.001786206
MSH6	2	ALL	1.42E-06 Homocysteine	4.24E-06
CTC-497E21.5	11	ALL	1.49E-06 HOMA-IR	1.54E-06

Insulin	1.81E-24	VLDL	2.72E-23	Triglycerides	2.72E-23
Urea	4.04E-13	HOMA-IR	6.55E-10	Insulin	1.23E-06
Glucose	6.20E-46	Insulin	3.02E-18	HsCRP	1.44E-15
HOMA-B	7.17E-52	Homocysteine	2.24E-14	Sodium	0.000119
Insulin	2.83E-28	Glucose	1.07E-10	Creatinine	2.57E-09
HOMA-B	6.42E-13	FEV1.FVC_Ratio	9.00E-07	BMI	9.36E-07
Creatinine	5.69E-14	Insulin	1.66E-13	Glucose	2.43E-06
Creatinine	0.000461	BMI	0.002677	Homocysteine	0.002837
HOMA-B	3.77E-09	Waist	2.55E-07	Hip	4.46E-06
Weight	1.37E-05	Total_Lean_Mass	6.16E-05	Waist	7.70E-05
Creatinine	4.49E-13	TotalCholesterol	0.000584	LDL	0.001085
VLDL	6.07E-12	Triglycerides	6.07E-12	HOMA-B	1.32E-09
HOMA-B	7.06E-10	Urea	0.002398	Insulin	0.002598
GGT	3.12E-08	HOMA-B	1.21E-07	VLDL	4.85E-06
GGT	3.89E-12	Glucose	2.68E-05	Hgb	0.006287
HOMA-B	3.76E-14	BMI	4.16E-06	Urea	1.07E-05
HOMA-B	3.79E-13	Glucose	8.21E-06	FEV1.FVC_Ratio	0.000691
Creatinine	3.18E-06	Insulin	2.56E-05	HOMA-B	4.27E-05
HOMA-B	1.11E-05	WHR	0.001233	VLDL	0.008252
HOMA-IR	3.73E-17	Insulin	8.61E-10	Glucose	2.41E-05
HOMA-IR	9.80E-07	Glucose	7.22E-05	Insulin	0.00016
HOMA-B	3.19E-07	WHR	0.000333	Insulin	0.00095
Insulin	7.89E-10	Creatinine	1.52E-05	Bicarbonate	0.000866
Creatinine	4.57E-07	Weight	0.000154	Total_Fat_Mass	0.000261
PLT	7.61E-07	MCH	9.69E-05	MCV	0.000147
Bilirubin	3.55E-05	HOMA-B	0.001161	LDL	0.001454
HDL	0.043139	Phosphate	0.044932		
Total_Fat_Mass	3.75E-05	Hip	0.000112	BMI	0.000167
HOMA-IR	0.000354	Weight	0.005078	Total_Lean_Mass	0.005568
HOMA-IR	7.75E-11	PLT	5.99E-05	Glucose	0.004112
GGT	1.41E-06	HOMA-IR	2.80E-06	Homocysteine	0.000104
ECG_HeartRate	5.29E-06	QT_Interval	0.001606	Bilirubin	0.002129
HOMA-B	3.87E-10	Phosphate	0.015091	Weight	0.037039
HsCRP	1.12E-06	Glucose	1.31E-06	FEV1.FVC_Ratio	7.38E-05
Urea	0.004779	Triglycerides	0.005126	VLDL	0.005126
VLDL	2.99E-11	Bilirubin	9.32E-07	HOMA-IR	1.25E-06
Hip	0.005354	Bilirubin	0.015295	Glucose	0.027995
HOMA-IR	0.000917	Diastolic_BP	0.00571	Glucose	0.009317
VLDL	5.02E-25	Alkaline	0.002263	PLT	0.00899
HOMA-B	1.06E-07	MCV	0.00048	Height	0.000577
Glucose	0.004099	ApoB	0.004803	HOMA-IR	0.029542
Glucose	0.000568	Homocysteine	0.002654	Urea	0.004073

PLT	0.000443 VLDL	0.022382 Triglycerides	0.022382
Glucose	2.11E-11 HsCRP	3.57E-09 Insulin	0.000125
Creatinine	0.00041 Hgb	0.00344 Alkaline	0.004603
HsCRP	1.25E-05 Phosphate	0.006127 TotalCholesterol	0.013511
Hip	7.59E-06 Weight	8.23E-06 BMI	1.34E-05
Alkaline	0.000196 Hip	0.001602 Weight	0.004886
ApoA1	0.000565 WBC	0.000922 GGT	0.014172
Insulin	0.003289 Weight	0.004129 Total_Lean_Mass	0.005566
HsCRP	0.001447 Hip	0.001457 Weight	0.001727
Phosphate	0.002479 Albumin	0.004063 HOMA-IR	0.007726
WBC	0.008621 Homocysteine	0.010815 PCV	0.011788
Insulin	7.18E-05 Glucose	0.021864	
RBC	1.85E-05 PCV	0.000236 FEV1	0.001912
Insulin	2.33E-08 Glucose	0.000238 RR_Interval	0.001502
HOMA-B	0.000771 HDL	0.001531 Albumin	0.001641
PCV	0.001651 Bilirubin	0.003559 Weight	0.011849
Insulin	0.000664 Glucose	0.001042 PCV	0.013281
Bicarbonate	0.000883 GGT	0.001962 VLDL	0.004607
Waist	3.95E-06 Hip	6.58E-06 Weight	2.10E-05
ApoA1	0.00644 Alkaline	0.007152 ApoB	0.008848
Homocysteine	5.46E-06 WBC	0.000756 Systolic_BP	0.02079
Systolic_BP	0.00394 Creatinine	0.008234 Albumin	0.019751
PLT	0.001577 HOMA-B	0.002078 Uric_Acid	0.008233
Uric_Acid	0.001223 Insulin	0.001659 Glucose	0.034376

PLT	2.09E-22	Glucose	1.31E-21	Urea	0.001561
Glucose	1.70E-05	WHR	0.000901	Hgb	0.008246
GGT	1.59E-07	Alkaline	0.000339	ApoB	0.000795
RR_Interval	0.0054	FEV1.FVC_Ratio	0.01839	ECG_HeartRate	0.033583
RBC	0.002369				
Weight	1.23E-05	Hip	0.000329	Total_Fat_Mass	0.000794
PCV	9.33E-05	QT_Interval	0.000714	Sodium	0.000903
Weight	0.004683	Urea	0.005013	Hip	0.015885
Weight	4.52E-06	Total_Fat_Mass	9.47E-06	BMI	1.70E-05
BMI	7.76E-05	Hip	0.00019	MCH	0.000218
MCV	0.003455	MCH	0.004398	ApoB	0.008071
HOMA-IR	1.02E-06	Urea	0.001802	Albumin	0.005415
Triglycerides	0.004864	VLDL	0.004864	Albumin	0.041153
Triglycerides	4.85E-06	Glucose	0.000181	FEV1.FVC_Ratio	0.000203
ApoA1	0.008889	PLT	0.010418	Uric_Acid	0.010497
Weight	0.000153	PCV	0.000156	Hip	0.000186
PLT	0.00521	RR_Interval	0.00715	VLDL	0.037518
Triglycerides	4.29E-05	VLDL	4.29E-05	HDL	0.000786
Triglycerides	0.008252	Sodium	0.013139	RR_Interval	0.0485
Height	0.008252	Uric_Acid	0.013208	WHR	0.014709
FVC	0.008165	Hgb	0.009453	Albumin	0.02424
BMI	0.005179	Total_Lean_Mass	0.008607	ECG_HeartRate	0.010927
Waist	0.002229	Uric_Acid	0.003206	HDL	0.003898
BMI	0.000288	Diastolic_BP	0.000306	FVC	0.001513
HOMA-B	0.000856	Diastolic_BP	0.010965	RR_Interval	0.022709
ApoB	0.002595	WBC	0.002639	ApoA1	0.007485
Weight	0.000228	Waist	0.000846	VLDL	0.002308
Urea	0.017938	BMI	0.018468	RBC	0.021578
Insulin	0.007591				
Height	0.010275	Urea	0.015338	Insulin	0.034351
Height	0.022761	ApoA1	0.027094	GGT	0.030202
Sodium	0.000159				
Insulin	3.73E-05	RR_Interval	0.000234	Total_Lean_Mass	0.00054
Total_Lean_Mass	0.030428	GGT	0.031343	Weight	0.032576
Height	0.045353	LDL	0.047224		
PCV	0.011564	Hgb	0.033835	RBC	0.035129
MCH	0.00064	Phosphate	0.04973		
Urea	0.048241				
Systolic_BP	0.014734	GGT	0.035515	WBC	0.048575

Total_Fat_Mass	0.035956	Phosphate	0.040017	
RBC	0.00609	Albumin	0.016666	HDL 0.038753
PCV	0.02823	ECG_HeartRate	0.038164	WHR 0.042638
Bicarbonate	0.035498	Total_Lean_Mass	0.044415	
Waist	2.70E-05	Glucose	0.000789	Total_Lean_Mass 0.000936
BMI	0.005105	Total_Lean_Mass	0.006675	
WHR	0.029127	Waist	0.038068	
BMI	0.007046	PCV	0.007442	Urea 0.012348
BMI	0.002234	Waist	0.003188	HDL 0.00408
HOMA-IR	0.012135	Height	0.041186	
Hgb	0.002284	Triglycerides	0.005669	VLDL 0.005669
ECG_HeartRate	0.004691			
ApoA1	0.002871	Sodium	0.003639	Waist 0.010095
BMI	0.012308	MCV	0.013736	Creatinine 0.016137
Diastolic_BP	0.028085	Triglycerides	0.031963	VLDL 0.031963
Triglycerides	0.004607	Diastolic_BP	0.012267	
BMI	3.32E-05	Insulin	0.000104	HOMA-B 0.000198
ECG_HeartRate	0.018078	Systolic_BP	0.020054	Homocysteine 0.03018
Sodium	0.032962	HOMA-B	0.048787	
Urea	0.010551	WHR	0.021964	

Bilirubin	0.003339	ApoA1	0.01104	Bicarbonate	0.02593
Triglycerides	0.01328	VLDL	0.01328	Bilirubin	0.0156
WBC	0.000861	Uric_Acid	0.0019	Urea	0.00247
Waist	0.001016	MCV	0.00719	WHR	0.00821
Homocysteine	0.000927	Total_Fat_	0.00097	Hgb	0.00147
Total_Fat_Mass	0.028278	Uric_Acid	0.04458	Waist	0.04702
Glucose	5.16E-05	Bilirubin	0.00038	Albumin	0.00074
Total_Fat_Mass	0.000324	RR_Interv	0.00129	MCV	0.00244
PCV	0.039889	Urea	0.04213		
Weight	0.005525	Uric_Acid	0.00573	Total_Lean_Mass	0.00836
Height	0.043719				
Homocysteine	0.002334	WBC	0.00803	RR_Interval	0.00816
Height	0.010503	FEV1.FV1	0.03703	Alkaline	0.03774
Hgb	0.000299	Total_Lea	0.00056	Waist	0.00136
Triglycerides	0.037518	ECG_Hea	0.04026	QT_Interval	0.04668
Glucose	0.006554	MCV	0.03515	ApoA1	0.04226
Urea	0.040728				
PCV	0.030418	WHR	0.03142	FEV1	0.03518
Urea	0.013039	Weight	0.02942	Waist	0.04994
Triglycerides	0.016871	VLDL	0.01687	WBC	0.02665
Waist	0.005047	Systolic_E	0.00506	Insulin	0.00983
ECG_HeartRate	0.023678	QT_Interv	0.03694	WHR	0.04544
TotalCholesterol	0.00909	Albumin	0.01882		
Triglycerides	0.002308	Creatinine	0.00518	Total_Lean_Mass	0.02466
HsCRP	0.035597	Hip	0.03774	Total_Fat_Mass	0.03868
RR_Interval	0.045788	Total_Lea	0.04725		
Weight	0.035397	Phosphate	0.04154		
Hip	0.001597	Weight	0.00163	ECG_HeartRate	0.00205
Phosphate	0.036744	PLT	0.04983		
Diastolic_BP	0.048804				

PLT	0.001363 Creatinine	0.01492 Triglycerides	0.03008
Total_Fat_Mass	0.015874 Hgb	0.03062 Hip	0.03753
PLT	0.007771 Bilirubin	0.00968 Urea	0.01288
Sodium	0.035945 BMI	0.04015 HOMA-IR	0.0414
Insulin	0.012658 QT_Interv	0.01341 Phosphate	0.02754
Total_Lean_Mass	0.030202 Total_Fat	0.03398 RBC	0.04251
Hgb	0.039197 Albumin	0.04169	
Uric_Acid	0.000326 Total_Lea	0.00247 Diastolic_BP	0.0074
Diastolic_BP	0.038143 WBC	0.04066	

Alkaline	0.03522		
Bicarbonate	0.03188	Homocysteine	0.03202
MCH	0.01115	Bilirubin	0.01316 WHR 0.01544 MCV
Total_Lean_Mass	0.00937	ApoB	0.01441 Bilirubin 0.0146 MCH
Weight	0.00157	BMI	0.00258 RBC 0.00321 WBC
Total_Lean_Mass	0.00107	FEV1.FVC_Ratio	0.00341 GGT 0.0044 WBC
QT_Interval	0.00366	Hgb	0.00458 LDL 0.01044 HDL
BMI	0.01097	Bilirubin	0.03248 LDL 0.03263 Hip
QT_Interval	0.01406	HDL	0.01604 ApoA1 0.02886 Sodium
Total_Lean_Mass	0.03806	PCV	0.04273 Bicarbona 0.04298 HDL
RBC	0.00139	Total_Fat_Mass	0.00661 Insulin 0.00785 Bilirubin
Weight	0.04664		
Glucose	0.02759	Hip	0.0309 Diastolic_ 0.03633 Albumin
Homocysteine	0.01109	FEV1	0.01287 Albumin 0.01523 WBC
Systolic_BP	0.04897		
Bilirubin	0.04091		
Bicarbonate	0.04538		
BMI	0.0023	Glucose	0.0296

VLDL	0.03008 Insulin	0.03262 RBC	0.03332 WBC
WBC	0.04381		
ApoA1	0.01469 Homocysteine	0.02003 Creatinine	0.03036
WBC	0.03174 ECG_HeartRate	0.0337 Glucose	0.03528 FEV1.FVC
Hgb	0.04311 Glucose	0.0448	
Glucose	0.04032 HsCRP	0.04368 Creatinine	0.04573

0.02861 Waist 0.03393

0.03141 Urea 0.04543

0.00396 PLT 0.00577 Hip 0.00778 Total_Lea 0.04461

0.03371

0.02101 ECG_Hea 0.03429 HsCRP 0.04106 WHR 0.04756

0.04276 FVC 0.04688

0.03993 ECG_Hea 0.04519 Insulin 0.04895

0.04587

0.01278 PLT 0.02546 ApoA1 0.04789

0.0425

0.01906 GGT 0.02066 Height 0.02288 Hip 0.03367 Uric_Acid 0.03734

0.03762

0.04553 LDL

0.0478 Uric_Acid 0.04891



Table S25. Number of genes consisting of only common variants significantly associated with si

Blood							Homocysteine	
Hgb	MCV	PCV	PLT	RBC	WBC	MCH	Homocysteine	
0	1	0	4	0	0	1	2	
Lipid						Inflammatory		
TotalChol	HDL	LDL	VLDL	ApoA1	ApoB	Triglyceric	HsCRP	
0	0	0	6	0	1	6	29	
Kidney							Liver	
Uric Acid	Bicarbona	Creatinine	Phosphate	Sodium	Urea	Albumin	Alkaline	
0	0	34	0	0	1	0	0	
Body							Electrical	
Height	Weight	BMI	Waist	Hip	WHR	ECG Hear	RR Interval	
0	0	1	3	0	0	0	1	

single trait.

Glycaemia		Insulin Resistance		
Glucose	Insulin	HOMA-B	HOMA-IR	
9	8	23	23	
Extended				
Total Fat		Total Lean Mass		
1	1			
Lung				
Bilirubin	GGT	FVC	FEV1	FEV1-FVC-Ratio
3	7	0	0	1
BP				
QT Interv:	SBP	DBP		
0	0	0		